

Remarks

Claim objections

The examiner objected to the form of claim 154. Claim 154 has been amended to overcome the objection. The amendment merely expresses subject matter that was present in the original claim and does not narrow the scope of the claim.

Double Patenting

The examiner indicates that, if claims 144, 146, 153, and 155 are found allowable, claims 178, 158, 182, and 186, respectively, will be objected to as substantial duplicates.

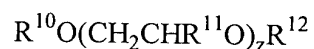
Claim 144 is directed to a demulsifier composition. Claim 177 (from which claim 178 depends) is directed to a brine. A brine and a demulsifier composition are not the same. Previously, the preamble of claim 177 contained the only recitation of the brine limitation. Claim 177 has been rearranged to recite the foregoing as a limitation in the body of the claim. The amendment does not narrow claim 177 or dependent claims, but merely clarifies what was inherent in original claim 177. Claims 153 and 155 are not substantial duplicates of claims 182 and 186 for the same reason.

The examiner contends that claim 158 is a substantial duplicate of claim 146. The examiner is incorrect. Claim 144 (from which claim 146 depends) is much broader than claim 158. Claim 144 requires the presence in the demulsifier composition of:

a second solubilizing quantity of a mutual organic solvent selected from the group consisting of water soluble glycol ethers, water soluble amides, water soluble ketones, and water soluble alcohols selected from the group consisting of methanol, ethanol, 1-propanol, and 2-propanol, said mutual organic solvent being effective to solubilize said demulsifier and said non-ionic surfactant to produce said demulsifier composition.

In contrast, claim 158 depends from claim 156, which requires the mutual organic solvent to comprise:

one or more water-soluble alkanol ethers having the formula



wherein

R^{10} , R^{11} and R^{12} independently are selected from the group consisting of hydrogen and alkyl groups having from about 1 to about 6 carbon atoms; and

z is from about 1 to about 22.

Applicant respectfully requests that the examiner withdraw any objections of these claims as substantial duplicates.

Rejections under 35 U.S.C. § 112

The examiner rejects claims 5-7 as indefinite under 35 U.S.C. § 112. Claims 4-8 are canceled.

The examiner objects that the phrase “a demulsifying amount of a demulsifier effective to perform a function” is indefinite because the phrase “a function” is not defined. Claims 144, 156, 176, and 177 have been amended to specify that the demulsifier comprises one or more salts of an alkaryl sulfonic acid. The amendment is believed to overcome any indefiniteness. Applicant notes that the word “function” still appears in the claims and that the remainder of the phrase states that the “function” is “selected from the group consisting of demulsifying an emulsion in an aqueous solution and preventing formation of an emulsion in an aqueous solution.”

Applicant respectfully requests that the rejections the under 35 U.S.C. §112 be withdrawn.

Rejection of claims 4, 8 and 144-210 as obvious over Juprasert in view of McCutcheon

The examiner maintains the rejection of claims 4, 8 and 144-210 over Juprasert in view of McCutcheon, Mokadam, Gardner, and a new reference--U.S. Patent No. 5,602,090 to Melikyan. The examiner repeats substantially the same arguments as in the previous office action, adding that Melikyan (col. 2, ll. 27-34, example and claims) discloses biodegradable industrial compositions employing sulfonates, nonionic surfactants and glycol ether solvents. Melikyan is said to disclose the use of "Biosoft N-411, a commercial isopropylamine linear dodecylbenzene sulfonate, in combination with . . . (EGMBE) and Neodol 25-9 (HLB 13.1)."

The examiner comments that Applicant's arguments are not deemed persuasive because Applicant did not point out what element of the claim is not taught in the Juprasert reference or the secondary references.

Response

All of the claims now specify that the demulsifier either is a 2-propanamine salt of dodecyl benzene sulfonic acid (claim 168 and dependent claims) or that the demulsifier is one or more salts of alkylaryl sulfonic acid (remaining claims). Claims 144, 156, and 168 each have been amended to clarify that the demulsifier composition "consists essentially of" the claimed components.

-Juprasert

The examiner has not pointed to a teaching or suggestion in Juprasert of a demulsifier composition which "consists essentially of" the **combination** of: (1) 2-propanamine salt of dodecyl benzene sulfonic acid or one or more salts of alkylaryl sulfonic acid; (2) the claimed non-ionic surfactant; **and** (3) the claimed mutual organic

solvent. Nor has the examiner pointed to a teaching or suggestion of the brine of claim 177 "comprising": (1) 2-propanamine salt of dodecyl benzene sulfonic acid or one or more salts of alkylaryl sulfonic acid; (2) the claimed non-ionic surfactant; **and** (3) the claimed mutual organic solvent.

The Juprasert patent describes an "aqueous wellbore treatment concentrate compris[ing] effective amounts of":

(a) a defoaming agent suitable for extinguishing foams in oil-brine-gas systems;

(b) a demulsifying agent, **suitable for demulsifying oil external emulsions**, that comprises a first surface active agent selected from the group consisting of first nonionic surface active agents, first anionic surface active agents and mixtures thereof; and

(c) optionally, a stabilizing agent, suitable for stabilizing the concentrate in the form of an aqueous emulsion.

Juprasert, col. 3, ll. 30-41 (emphasis added). See also col. 3, ll. 61-65, containing the same description of emulsifiers in a second embodiment.

Applicant first notes that the claimed demulsifier composition, is "to prevent or resolve downhole emulsions in **aqueous solutions**." Preamble of claims 144, 156, 168, and 176. Hence, the demulsifier composition is also claimed in a brine (claim 177 and dependent claims). In contrast, Juprasert "relates to enhanced oil recovery from petroleum-bearing formations. More particularly, it relates to an improved method of stimulating petroleum from hydrocarbon bearing formations wherein foams and emulsions are both present in and around the wellbore, either naturally or as a result of fluid (steam, water or non-condensable gases) injection." Juprasert, col. 1, ll. 8-14. As Juprasert explains:

Oil in virtually all reservoirs contains dissolved gases which originate internally within the oil. During oil production, oil flows from the formation towards the wellbore which results in two critical phenomena. First, the oil reaching the wellbore is at a lower pressure relative to oil in the formation. **This pressure depletion leads to the evolution of dissolved gases which causes bubbles to form in the oil. The presence of these dispersed bubbles increases the effective viscosity of the oil.** The viscosity effect is particularly pronounced in reservoirs of heavy oils. Although the amount of dissolved gas may not be large, the effect can be significant because of the **high stability of the foam and its ability to build up over time.** By way of comparison, at atmospheric pressure, a heavy oil sample is capable of sustaining bubbles (e.g., foams) of free gas in solution as long as 4 to 5 hours before the gas is liberated. In contrast, free gas may be liberated from light oil in less than 1 minute. Furthermore, **in heavy oil, some of the evolved gas in the form of bubbles (or foams) may be immobile, that is, the gas cannot flow to the wellbore or migrate upward in the formation; rather, the viscous oil accumulates around the wellbore.** This phenomenon has been observed in low gravity oil (below 20° API) reservoirs, such as shallow San Joaquin Valley fields in California with a depth of less than 1,500 feet.

The second phenomenon associated with the flow of oil towards the wellbore is that the velocity of the oil reaching the wellbore is higher than the oil velocity at other parts of the reservoir. **If water is present in the vicinity of the wellbore, the attendant mixing of the immiscible oil and water caused by the velocity increase results in the formation of emulsions that are stabilized by fine particles or asphaltenes from the crude oil. These are generally oil external emulsions which have higher viscosities than either oil or water in the formation.** The effective viscosity is determined principally by the amount of water dispersed in the oil. The water may be connate and/or water from steam injection. Both phenomena generally occur at the same time, that is, the oil viscosity is enhanced by the presence of both the gas bubbles and dispersed water droplets.

Juprasert, col. 1, ll. 18-55 (emphasis added). Juprasert's demulsifying agent is "**suitable for demulsifying oil external emulsions**" (col. 2, l. 31-32, emphasis added), as opposed to being suitable for demulsifying "emulsions in **aqueous solutions,**" as claimed.

-The demulsifier

The demulsifier in the claims is one or more salts of alkaryl sulfonic acid (144, 156, 176, 177), preferably 2-propanamine salt of dodecyl benzene sulfonic acid (claim 168). Suitable demulsifying agents for Juprasert's compositions are described beginning

at col. 6, and include "ethoxylated alkyl phenols, ethoxylated alcohols, block copolymers of ethylene oxide and propylene oxide, oxyalkylated glycol esters, and mixtures thereof."

Juprasert col. 6, ll. 17-20. Juprasert states that

Preferred nonionic surfactants include difunctional block-polymers terminating in primary hydroxyl groups include polyoxyalkylene derivatives of propylene oxide and ethylene oxide and are available from BASF Corp., Parsippany, N.J., under the tradenames PLURONIC L-43 and PLURONIC L-92. A preferred embodiment of the wellbore treatment concentrate has a demulsifying agent that comprises about equal amounts of PLURONIC L43 and PLURONIC L-92.

Juprasert, col. 6, ll. 21-26. Juprasert also teaches, at col. 7, ll. 46-49, that "[s]uitable anionic surfactants for the demulsifying agent include, for example, alkyl benzene sulfonates, alkyl toluene sulfonates, ethoxylated carboxylates, carboxylates, and mixtures thereof."

The examiner has not pointed to any teaching or suggestion in Juprasert or elsewhere that would motivate a person of ordinary skill in the art to select alkyl benzene sulfonates or alkyl toluene sulfonates from the foregoing list, as opposed to Juprasert's preferred nonionic surfactant PLURONIC materials. The examiner has not pointed to a teaching or suggestion to select an amine salt of an alkylaryl sulfonic acid (claims 154, 193-198, and 211-213). The examiner certainly has not pointed to a teaching or suggestion in Juprasert that would motivate a person of ordinary skill in the art to select 2-propanamine salt of dodecyl benzene sulfonic acid (claim 168) as the demulsifier.

-Mutual organic solvent

The examiner contends that the claimed mutual organic solvents read on Juprasert's stabilizing materials. The examiner has not established that persons of ordinary skill in the art would look to Juprasert, which is directed to a demulsifier "suitable for demulsifying oil external emulsions" (col. 2, l. 31-32, emphasis added)

for guidance in formulating a demulsifier composition for demulsifying “emulsions in aqueous solutions,” as claimed.

Even if the examiner disagrees, Juprasert contains a broad list of stabilizers:

Preferred stabilizing agents include, for example, glycols such as ethylene glycol, propylene glycol, glycerol, polypropylene glycol, polyethylene glycol, and mixtures thereof. Another preferred stabilizing agent comprises a water soluble polymer that includes carboxymethyl cellulose, hydroxyethyl cellulose and other water soluble modified cellulosic polymers, xanthan gums, polyacrylamides, polysiloxane polyalkyl polyether copolymers, anionic acrylic copolymers, alkali metal alginates and other water soluble alginates, carboxyvinyl polymers, polyvinylpyrrolidones, polyacrylates, and mixtures thereof.

The examiner has not pointed to any teaching or suggestion that would motivate a person of ordinary skill in the art to select any of the foregoing broad list of stabilizers for the express purpose of mutually solubilizing a 2-propanamine salt of dodecyl benzene sulfonic acid (claim 168) or one or more salts of alkylaryl sulfonic acid (claims 144, 156, 176 and 177).

Hence, even if a person of ordinary skill in the art would look to Juprasert for guidance, the examiner has pointed to no direction in Juprasert that would motivate one to make the claimed selections to result in the claimed combination. *In re Geiger*, 2 U.S.P.Q.2d 1276, 1278 (Fed. Cir. 1987). A person of ordinary skill could combine the teachings of Juprasert to result in innumerable combinations. The odds of a person of ordinary skill in the art choosing the claimed combination are minute. *See In re Ruschig*, 145 U.S.P.Q. 274, 282 (C.C.P.A. 1965).

It is not enough for the examiner to merely identify individual components of a claimed invention in even a **single reference**. *In re Kotzab*, 55 U.S.P.Q.2d 1313, 1317 (Fed. Cir. 2000). “[P]articular findings must be made as to the reason the skilled artisan,

with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.” *Id.* at 1317.

The examiner has not made particular findings as to the reason the skilled artisan, with no knowledge of the claimed invention, would have (1) selected as a demulsifier a 2-propanamine salt of dodecyl benzene sulfonic acid (claim 168) or one or more salts of alkylaryl sulfonic acid (claims 144, 156, 176 and 177), and then (2) selected one of the following from Juprasert’s broad list of stabilizers to serve a mutual organic solvent for that sulfonic acid salt and the claimed non-ionic surfactant:

claims 144, 176, and 177:

a second solubilizing quantity of a mutual organic solvent selected from the group consisting of water soluble glycol ethers, water soluble amides, water soluble ketones, and water soluble alcohols selected from the group consisting of methanol, ethanol, 1-propanol, and 2-propanol, said mutual organic solvent being effective to solubilize said demulsifier and said non-ionic surfactant to produce said demulsifier composition.

claim 156:

a second solubilizing quantity of a mutual organic solvent comprising one or more water-soluble alkanol ethers having the formula



wherein

R^{10} , R^{11} and R^{12} independently are selected from the group consisting of hydrogen and alkyl groups having from about 1 to about 6 carbon atoms; and

z is from about 1 to about 22.

claim 168:

a second solubilizing quantity of a mutual organic solvent selected from the group consisting of ethylene glycol monobutyl ether (EGMBE) and ethylene glycol monomethyl ether (EGMME).

The examiner also contends that the mutual organic solvent reads on the listing of glycol ethers at col. 12, l. 4. However, the cited portion of Juprasert relates to a "solvent pre-treatment" used "prior to using the wellbore treatment fluid for defoaming and demulsifying":

For example, a well which has asphaltic or waxy deposits in the wellbore or near wellbore region might require a solvent pre-treatment to remove such deposits **prior to using the wellbore treatment fluid for defoaming and demulsifying**. The solvent treatment could be a refined solvent or intermediate refinery stream depending on the nature of the asphaltic or waxy deposit. The solvent treatment could also be a formulated solvent containing oil soluble or oil dispersible nonionic or anionic surfactants or both, polar solvents such as alcohols, glycols, ethers, esters, ketones, glycol ethers, and mixed hydrocarbon solvents containing aliphatic, alicyclic, cycloaromatic, aromatic, or polynuclear aromatic compounds.

And even this teaching in Juprasert includes a wide variety of pretreatment solvents. Even if the foregoing pretreatment solvents could be read as corresponding to a mutual organic solvent included as a component in the demulsifier composition, itself--which Applicant denies--the examiner has not pointed to a teaching or suggestion that would motivate a person of ordinary skill in the art to make the selections required by the claims.

The secondary references do not provide the necessary motivation to make the selections required to result in the claimed combination.

-McCutcheon

McCutcheon is cited as teaching "commonly known surfactants" including "ethoxylated alcohols." The examiner has pointed to nothing in McCutcheon that would motivate a person of ordinary skill in the art to make the selections described above.

-Mokadam

The examiner apparently contends that Mokadam supplies the necessary motivation to select the claimed salts of alkylaryl sulfonic acid for use in the claimed demulsifier composition and brine; however, the "Sulfonated Surfactants" actually taught for use by Mokadam are described at col. 3, ll. 1-41, substituents at col. 2, ll. 30-37. The examiner has not pointed to a teaching or suggestion of an aromatic substituent on the sulfonated surfactants taught for use by Mokadam. The examiner clearly has not pointed to a teaching in Mokadam to use a 2-propanamine salt of dodecyl benzene sulfonic acid as the demulsifier (claim 168 and dependent claims).

The portion of Mokadam pointed to by the examiner actually teaches away from using dodecylbenzene sulfonic acid as the demulsifier:

One of the significant advantages of the Sulfonated Surfactant used in the method of the present invention over prior art antisludge surfactants such as Dodecylbenzene Sulfonic Acid (DDBSA) is that it is soluble in the acid solution. DDBSA is not soluble in the acid solution and therefore requires other surfactants or dispersants in the system.

Mokadam, col. 4, ll. 40-46, substituents at col. 2, ll. 30-37. See also col. 7, ll. 57-65:

DDBSA is the standard antisludge agent against which antisludge surfactants are compared. Although DDBSA is an effective antisludge additive for oil field acidizing operations (as demonstrated by the experiments), it has a major disadvantage in such operations: DDBSA is not soluble in the acid solution and therefore must be used in a formulation with other additives such as other surfactants and dispersants to render the DDBSA soluble or dispersable in the acid solution. This adds appreciably to the costs.

Mokadam's teaching away from selecting the claimed salts of alkylaryl sulfonates is evidence of unobviousness. *In re Hedges*, 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986), quoting *W. L. Gore & Assoc. v. Garlock, Inc.*, 220 U.S.P.Q.303, 312 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

Furthermore, the only combination that the examiner points to comprising the "DDBSA" is a "commercial antisludge formulation" described as including "nonionic surfactant," "alcohol" and "dispersant." Mokadam, col. 4, ll. 48-58. The examiner has not pointed to any teaching or suggestion that the "nonionic surfactant," the "alcohol," and/or the "dispersant" are such as to result in the combination of components required by the claims.

-Gardner

The examiner points to Gardner as teaching a "mutual solvent to make otherwise insoluble chemicals soluble in the aqueous phase." The examiner has not pointed to a teaching in Gardner of a demulsifier composition. The examiner certainly has not pointed to a teaching in Gardner of a demulsifier composition comprising (1) 2-propanamine salt of dodecyl benzene sulfonic acid or one or more salts of alkylaryl sulfonic acid; (2) the claimed non-ionic surfactant; **and** (3) the claimed mutual organic solvent. The examiner has not pointed to a teaching or suggestion that would motivate a person of ordinary skill in the art to select as a demulsifier (1) 2-propanamine salt of dodecyl benzene sulfonic acid or one or more salts of alkylaryl sulfonic acid, and then (2) to substitute Gardner's mutual solvent for use in with that demulsifier.

-Melikyan

The examiner cites Melikyan as teaching a composition comprising "isopropylamine linear dodecylbenzene sulfonate, in combination with ethylene glycol monobutyl ether (EGMBE) and Neodol 25-9 (HLB 13.1)."

The examiner has not pointed to a teaching or suggestion that Melikyan's cleaning compositions are suitable for use "to prevent or resolve downhole emulsions in aqueous

solutions.” Also, the claims are directed to a demulsifier which “consist[s] essentially of” the claimed components. The claims do not read on Melikyan’s compositions which: “all include a terpene, an anti-oxidant to stabilize the terpene, two anionic surfactants, a nonionic surfactant, and hydrogen peroxide, all in a deionized water solution.” Melikyan, col. 2, ll. 14-17.

The examiner does not even contend that Melikyan teaches or suggests a “brine selected from the group consisting of a drilling fluid, a workover fluid, and a completion fluid” comprising the claimed combination.

CONCLUSION

For all of the foregoing reasons, Applicant respectfully requests consideration and allowance of the pending claims.

~~Respectfully submitted,~~



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